3.3.3 Hazardous Material Incidents

Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in plants.

3.3.3.1 Background

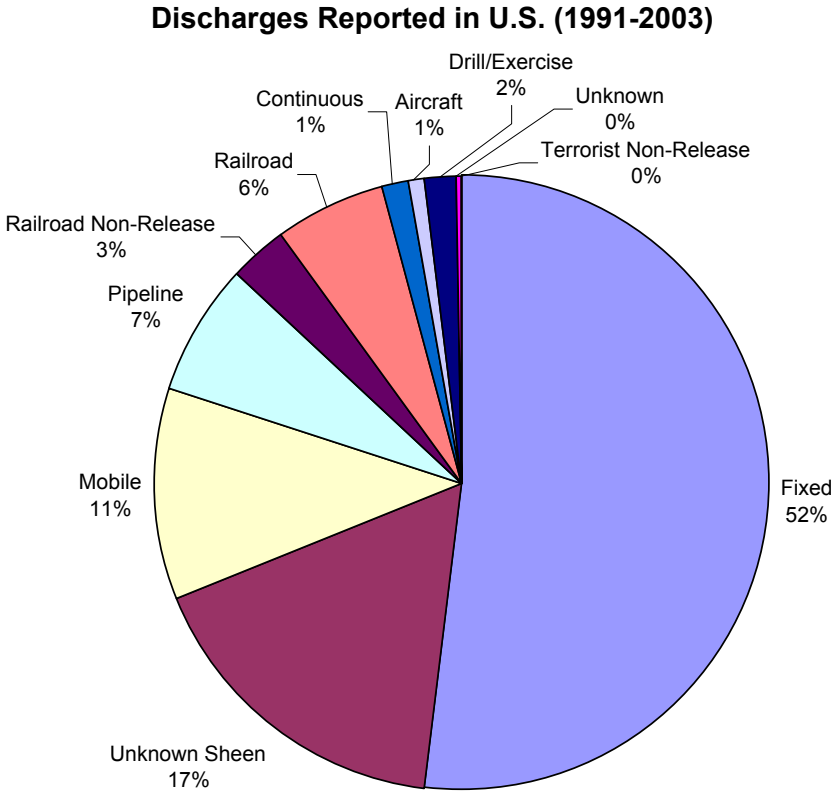
- A hazardous materials accident can occur anywhere. Communities located near chemical manufacturing plants are particularly at risk. However, hazardous materials are transported on our roadways, railways and waterways daily, so any area is considered vulnerable to an accident.
- Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property.
- Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States--from major industrial plants to local dry cleaning establishments or gardening supply stores.
- As many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals." Each year, over 1,000 new synthetic chemicals are introduced.
- The Emergency Planning and Community Right-to-Know Act requires that detailed information about hazardous substances in or near communities be available at the public's request. The law provides stiff penalties for companies that fail to comply and allows citizens to file lawsuits against companies and government agencies to force them to obey the law.
- The Montana Department of Transportation (MDT) regulates transportation routes and speed limits used by carriers and monitor the types of hazardous materials crossing state lines.
- Between 1982 and 1991, there was an annual average of 6,774 hazardous materials transportation incidents nationwide. In 1991, there were 9,069 transportation incidents that resulted in 10 deaths and 436 injuries.
- The most common type of transportation hazardous material incident is from highway crashes (**Table 3.3.3-1**), followed by railroad incidents.
- Nationwide, most oil, chemical, and other discharges to the environment are from fixed facilities (52%) (**Figure 3.3.3-1).** In contrast, discharges from mobile facilities, including railroad, airline, and trucking, total about 18%.
- Montana has 3,117 EPA-regulated facilities. These fixed facilities are responsible for one or more of the following: discharge to water, have toxic releases, handle hazardous waste, are Superfund facilities, or have airborne discharges.

Table 3.3.3-1 Hazardous Materials Incidents in the U.S. by Transportation Mode (totals, 1983 thru 1990). Source: FEMA, 2004a

Mode of Transportation	Number of Accidents	Associated Deaths	Associated Injuries
Air	1,220	0	153
Highway	41,781	79	1,569
Railway	7,886	1	423
Water	83	1	35
Other	29	0	2
Total	**50,999**	**81**	**2,182**

(Sources FEMA, 2004a; EPA, 2004; NRC, 2004.)

Figure 3.3.3-1 **Incidents reported to the National Response Center (NRC) from 1991 to 2003,** excluding vessel and oil drilling platform discharges. The NRC is the national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States. Source: NRC, 2004.



3.3.3.2 History of Hazardous Material Incidents in Montana

In Montana since 1993, 190 accidental releases have been reported from fixed facilities and transportation-related accidents that have exceeded 100 gallons (NRC, 2004; USDOT 2004). The most commonly-released substances have been refined petroleum products and crude oil. **Table 3.3.3-2** below summarizes the substances released by total volume and spills by either fixed facility or transportation-related incident. The table shows the greatest volume of substance released was gasoline and the most common spill was diesel fuel.

Table 3.3.3-2 Summary of Releases by Substance (1999 - 2004). Source: NRC, 2004

	Transportation			Fixed Facilities		
Substance	**Amount**	**Units**	**Spills**	**Amount**	**Units**	**Spills**
Gasoline	17,093	Gallons	8	90,558	gallons	9
Crude Oil	4,925	Gallons	5	84,520	gallons	13
Aviation Fuel	22,800	Gallons	4	0	gallons	0
Diesel/Fuel Oil	14,934	Gallons	14	83,138	gallons	19
Asphalt	55,000	Gallons	5	200	gallons	1
Other Refined Oil Products	0	Gallons	0	50,313	gallons	18
Acids (Sulfuric/ Hydrochloric)	400	Gallons	2	16,300	gallons	9
Ammonia	2,324	Gallons	3	5,777	pounds (gas)	7
Chlorine Gas	16,250	pounds (gas)	1	250	pounds (gas)	2
Sulfur Dioxide (gas)	0	Gallons	0	29,790	pounds (gas)	3
Methanol/Alcohol	26,133	Gallons	3	33,000	gallons	1

Table 3.3.3-3 shows a more recent summary of the hazardous material incidents reported to the National Response Center (NRC) by type of release (1999 to 2004). During this time, 475 incidents were reported. Most of the incidents (51%) were from fixed facilities, similar to the national average (52%). The second-most abundant incident type was from mobile facilities (13%), compared to the 11% national average.

Table 3.3.3-3 Hazardous Material Incidents Types and Receptors in Montana (1999-2004). Source: NRC, 2004.

Type of Incident	Air	Land & soil	Other	Subsurface	Unknown	Water	No Release	No Info	Total
Aircraft							1		1
Continuous	4							7	11
Fixed	109	81	10	3	4	43			250
Mobile	4	29			2	26	2		63
Pipeline	8	18	1	2	1	10	1		41
Railroad		15				4		8	27
Railroad-nonrelease									37
Storage Tank	7	23	1		1	10			42
Unknown Sheen						5			5
Vessel						3			3
TOTAL	**132**	**166**	**12**	**5**	**8**	**101**	**4**	**15**	**480**

The most significant transportation-related releases in the last ten years are listed in **Table 3.3.3-4**. The largest spills from fixed facilities are shown in **Table 3.3.3-5.**

Table 3.3.3-4 Largest Transportation-Related Spills (1993-2003).
Source: USDOT, 2004

Location/County	Date	Type Accident	Substance(s)	Amount	Units	Injuries/Deaths
Bozeman/Gallatin	8/15/02	Derailment	Asphalt	45,583	gals	0/0
Sidney/Richland	12/28/00	Vehicle Accident	Ammonium Nitrate	38,000	lbs	0/0
Drummond/Granite	9/30/99	Derailment	Alcohol	26,033	gals	0/0
Paradise/Sanders	7/11/99	Derailment	Asphalt	55,000	gals	0/0
Hardin/Big Horn	1/2/99	Vehicle Accident	Fuel Oil	5,700	gals	0/0
Lincoln/Lewis & Clark	10/4/97	Vehicle Accident	Formaldehyde	3,375	gals	0/0
Alberton/Mineral (see description)	4/11/96	Derailment	Potassium Hydroxide	17,000	gals	123/1
			Chlorine	16,250	gals	
			Sodium Chlorate	680	lbs	
Helena/Lewis & Clark	6/23/95	Derailment	Aviation Fuel	16,700	gals	0/0
Great Falls/Cascade	12/23/93	Derailment	Aviation Fuel	5,900	gals	0/0

Table 3.3.3-5 Large Fixed Facility Spills (1993-2003). Source, NRC, 2004.

Location/County	Date	Type Accident	Substance(s)	Amount	Units
Poplar/Roosevelt	2/9/02	Storage Tank Leak	Crude Oil	900	Barrels
Helena/Lewis & Clark	12/13/00	Storage Tank Leak	Gasoline	1,000	Barrels
Billings/Yellowstone	7/5/00	Equipment Failure and Storage Tank Leak	Methanol	33,000	Gallons
Conrad/Pondera	6/26/00	Leak in Fiberglass Holding Tank	Hydrochloric Acid	8,000	Gallons
Conrad/Pondera	11/19/99	Vandalism/Opened Valve	Anhydrous Ammonia	2500	Pounds
Great Falls/Cascade	10/16/99	Line Rupture	Fuel Oil	1,200	Barrels
Whitehall/Jefferson	6/20/99	Processing Fluid Release from Equipment Malfunction	Sodium Cyanide Solution	10,000	Gallons
Laurel/Jefferson	9/23/98	Pipeline Pump Station Leak	Gasoline	630	Barrels
Billings/Yellowstone	11/11/98	Planned Release through Flare at Equipment Start-up	Sulfur Dioxide	27,500	Pounds
Colstrip/Rosebud	9/8/97	Leaking Valve From Chemical Storage Tank	Sulfuric Acid	4,800	Gallons
Fairview/Richland	6/8/95	Leaking Valve on Pipeline	Crude Oil	300	Barrels
Cut Bank/Glacier	3/24/95	Vent Valve Failure	Gasoline	8,000	Gallons
Miles City/Custer	11/29/93	Storage Tank Collapse	Fuel Oil	10,000	Gallons
Baker/Fallon	6/11/93	Overfill of Storage Tank	Crude oil	500	Barrels

Alberton Chlorine Spill

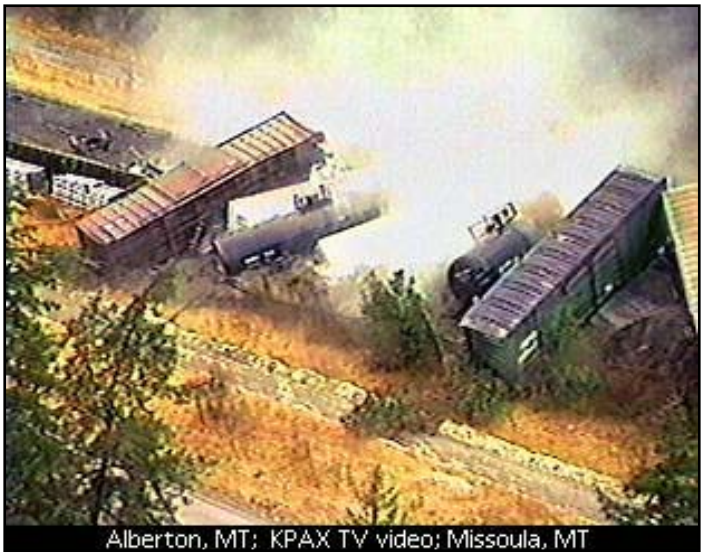
On April 11, 1996, 19 cars from a Montana Rail Link (MRL) freight train derailed near Alberton, Montana. Six of the derailed cars contained hazardous materials. One derailed tank car containing chlorine (a poison gas) ruptured, releasing 130,000 pounds of chlorine into the atmosphere; another tank car containing potassium hydroxide solution (potassium cresylate, a corrosive liquid) lost 17,000 gallons of product; and a covered hopper car containing sodium chlorate (an oxidizer) spilled 85 dry gallons onto the ground. This chlorine spill is the second largest in US history.

About 1,000 people from the surrounding area were evacuated. Approximately 350 people were treated for chlorine inhalation, 123 of whom sustained injury. Nine people, including both members of the train crew, were hospitalized. A transient riding the train died from acute chlorine toxicity.

U.S. Interstate Highway 90 (I-90) is roughly parallel and about 150 yards north of the MRL tracks at the accident site. The hazardous material cloud drifted across I-90 resulting in multiple highway traffic accidents. Several motorists were stranded in the cloud after these accidents. I-90 was closed following the accident requiring an 81-mile detour. Monetary damage was estimated to be $3.9 million.

The Governor of Montana declared a state of emergency in Missoula and Mineral Counties. On April 14, 1996 the evacuation area was reduced to 15 square miles; the residents were temporarily escorted into the area to feed and water livestock animals, retrieve some personal possessions, and locate pets (NTSB 1998).

Photo 3.3-1 Alberton Derailment, Chlorine Gas Release



Alberton, MT; KPAX TV video; Missoula, MT

3.3.3.3 Declared Disasters from Hazardous Material Incidents

Two separate incidents that occurred within one week are the only two state emergency declarations for hazardous material release: the Alberton Chlorine Spill and derailment involving a chlorine tanker car near Dodson (see **Table 3.3.3-6**). The Dodson derailment did not cause a release of the chlorine.

Table 3.3.3-6 State and Federal Declarations for Hazardous Materials in Montana, 1974 to August 6, 2003. Source MDES, 2003.

Incident	Date	Spill	Cost
Train Derailment at Alberton, MT (EO 8-96)	4/11/96	3 Chlorine tank cars	State: $417
Train Derailment Phillips County, Dodson (EO 9-96)	4/17/96	Chlorine tanker	State: $3,806

3.3.3.4 Vulnerability to Hazardous Material Incidents

3.3.3.4.1 Statewide Vulnerability to Hazardous Material Incidents

The volume and type of hazardous materials that flow into, are stored, and flow through communities will determine exposure to a potential release of hazardous materials.

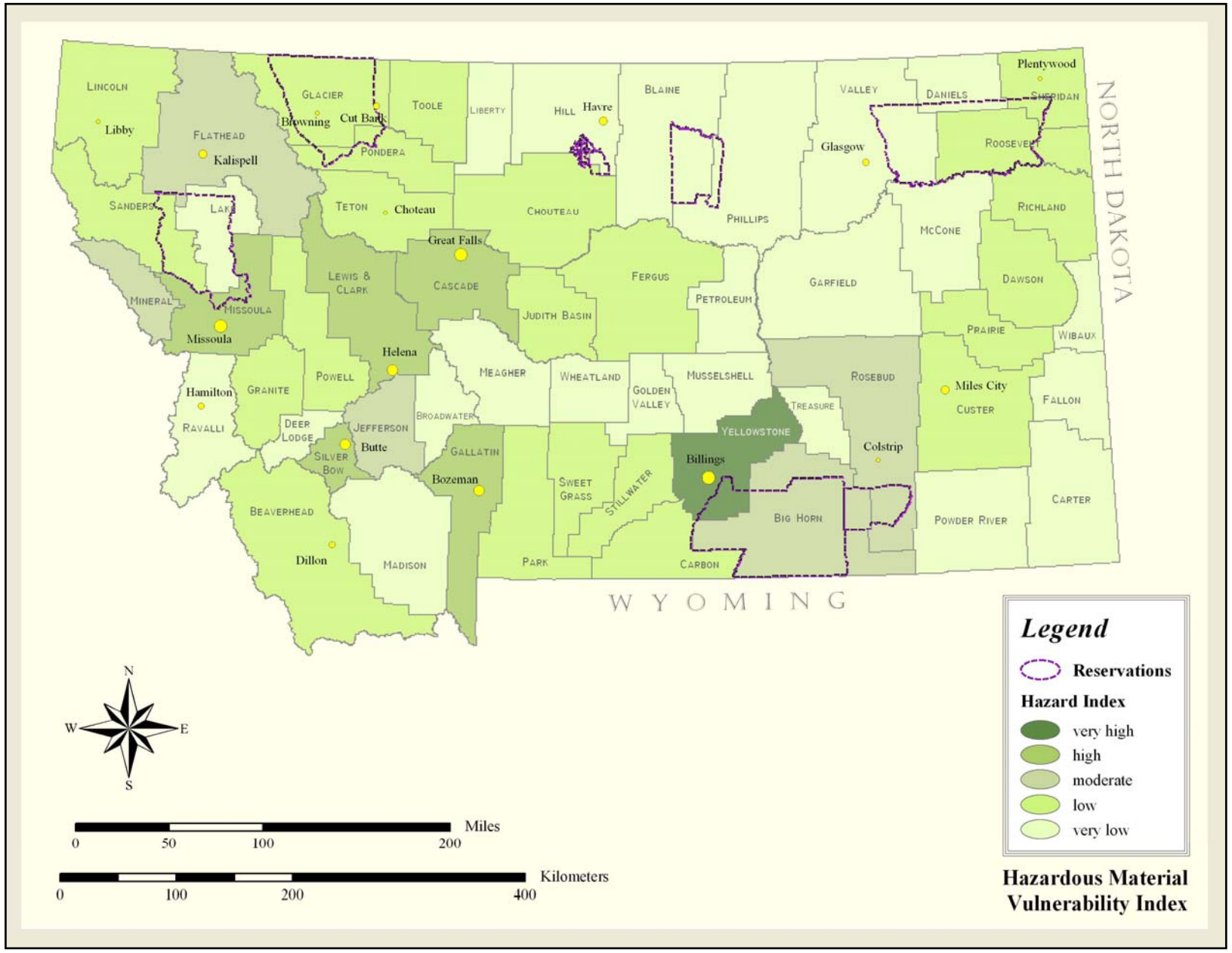
The spill database, and locations of generator facilities and transportation routes (pipeline, rail, interstate) were compiled by county to identify relative vulnerability. Each factor was rated on a scale of 0 to 100, with the maximum of the range equaling 100 and no occurrences equal to zero. Each occurrence per county was factored by 100/max occurrence in that county. The 7 factors were averaged to derive a composite index. For example, the maximum number of transportation spills in a single county was 167 for Yellowstone County. Lewis and Clark County had 15 transportation-related hazardous material releases for a score of 15*0.60, or 9.0, compared to Yellowstone's score of 100. **Table 3.3.3-7** shows vulnerability scores of the top ten counties for hazardous material spills. **Figure 3.3.3-2** shows the relative vulnerability across the state by county.

Table 3.3.3-7 Counties with High or Moderate Hazardous Material Composite Index

	Spills		Generators		Miles			Haz Mat
County	Trans-portation	Fixed Facilities	LQG	TRI	Interstate	Pipeline	Rail	Comp Risk Index
Yellowstone	167	119	7	13	95	332	168	96.98
Cascade	25	29	3	1	61	118	196	40.21
Missoula	17	21	3	5	55	49	190	38.61
Gallatin	9	10	2	3	44	41	213	31.96
Lewis and Clark	15	35	3	3	50	44	104	31.25
Silver Bow	27	5	5	1	55	0	127	30.98
Jefferson	1	7	0	4	95	5	134	28.72
Rosebud	3	9	2	2	42	56	182	28.52
Flathead	6	20	6	3	0	0	122	26.64
Big Horn	4	4	0	2	82	77	94	24.87
Mineral	8	1	0	0	77	0	138	21.66

Transportation Spills (USDOT, 2004) Hazardous Material Incident Statistics 1993-2003
Fixed Spills from National Response Center (NRC, 2004) Call Records 1993-2003
LQG: Large Quantity Generators of Hazardous Waste from USEPA Envirofacts Query
TRI: Facilities required to report toxic releases from USEPA TRI Explorer (EPA, 2004)
Interstate: Interstate Miles from NRIS Highway shapefile coverage (NRIS, 2004)
Pipeline: Pipeline Miles from NRIS Pipeline shapefile coverage (NRIS, 2004) (See **Figure 3.2.2-4**)
Rail: Rail Miles from NRIS Railline shapefile coverage (NRIS, 2004) (See **Figure 3.2.2-2**)

Figure 3.3.3-2 Hazardous Material Vulnerability Index



3.3.3.4.2 Review of Potential Losses in Local PDM Plans

Each of the 6 counties with completed local PDM Plans, only 3 identified hazardous material releases as one of their primary hazards in the county:

- Broadwater County ranked hazardous material releases as the highest hazard within the county with the potential to have a high impact on the population and economy. A hazardous material incident could cause up to **$15 million** in property damage.
- Butte-Silver Bow County ranked hazardous material releases as one of the top three hazards in the county. The hazard assessment incorporated existing threats from exposure to existing contamination related to the Superfund designation which encompasses much of Butte. The county identified that hazardous material and water pollution is one of the highest threats to the county and that the probability of occurrence and general vulnerability for the hazard was considered moderate.
- Yellowstone County was declared to be very vulnerable to hazardous material releases because of the numerous refineries and chemical businesses with hazardous materials.

3.3.3.4.3 Vulnerability of State Property

Current data and history does not suggest that state property is highly vulnerable to hazardous material releases, however, depending on the proximity of state facilities to hazardous material transportation routes and fixed facilities, some locations may be more vulnerable than others. Since the locations of State buildings have not been geo-referenced, assessing the potential exposure of property and buildings from hazardous material releases would be highly inaccurate.

3.3.3.5 Hazardous Material Incidents Data Limitations

Fixed facilities that generate or store hazardous materials have not been mapped on a statewide basis. Such mapping, coupled with the type and maximum amount of hazardous material being generated or stored, would allow for the identification of hazard zones surrounding the facility. In addition, the current Montana State building database is not geo-referenced and cannot be effectively related to spatial coordinates except in general locations (by city or zip code centroid). Detailed transportation analyses identifying the types and number of vehicles transporting hazardous materials, such as the one conducted by Butte-Silver Bow (BSHM, 2004), have not been conducted statewide and could prove useful for future assessments.

3.3.3.6 Hazardous Material Incidents References

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